Happy Accidents: Asperger, Einstein, and the Great Apes, featuring Dr. Dean Falk

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Evangeline Coker: So, I wanted to start with the beginning of your research journey. What brought you into American evolutionary anthropology?

Dean Falk: Ending up in evolutionary anthropology was accidental, in a way, because I began in something else. I was an undergraduate majoring in mathematics, and I needed a requirement where I ended up in a biological anthropology course with a fabulous teacher. He was a zoologist named Charles Reed. The course was so interesting I decided by the end of the semester, this is what I want to study. I remember him talking about everything from pyramids in Egypt to chimpanzees, and about the brain, a little bit about cognition. I was like, *hey, this field is really interesting*.

Evangeline Coker: So, you're talking about how the brain works and cognition. Could you tell me a bit about how that became part of your research?

Dean Falk: In terms of becoming interested in the brain, I did either an honors paper, maybe with my master's degree, studying crania (skulls) in the fossil record related to humans, people called cavemen. I did that work with Charles Reid and realized there was a trend towards increasing brain size over time in our ancestors. That was the first little glimpse or beginning of my interest in the brain. It started with skulls in the brain case. Eventually, I became interested in the contents of the brain case. Fortunately, one can tell something about from the inside of the skull. With luck, what's stamped on the inside of the skull is an imprint of the outside surface of the brain, which was made when the animal was alive with the cerebral cortex.

Evangeline Coker: Wait, so that imprint stays almost like a fossil? Like a fish that dies in the rock, and you see the fish's skeleton. You can see the shape of the brain.

Dean Falk: It's what would be called a "trace fossil". Like a fossilized footprint is called a trace fossil. You don't have the foot, or the foot bones, but you have the imprint. So, the brain leaves an impression inside the skull, and it may be a good impression. Some animals make really good endocasts. We see a lot of details. Humans do not make endocasts. Our brains just don't print that much detail inside our skulls, but it's the cerebral cortex, the groove, it's bumpy, and those can become reproduced or leave an impression that fossilizes inside the skull. The cerebral cortex, or the outside part of the brain, is where we do our highest rational thinking in language. Fortunately, because that's the part that we have a trace of in the fossil record. Luckily!

Evangeline Coker: You've published works on the acquisition of language as it pertains to evolution. Could you tell us a bit about those?

Dean Falk: Sure. You know people go, what makes humans, *"human"*? There have been a lot of ideas about that. Man, the hunter, has been a popular one, or the idea that making tools is another widely suggested belief. Or freeing our forearms to carry things. That was important too, for higher cognition. I think, for a lot of reasons, that the thing that set our ancestors on a very

unique evolutionary trajectory was the emergence and evolution of language. I think that because no other animal has language the way that people do. Yes, dolphins are down there whistling and clicking to each other, and great apes like chimpanzees have complicated calls that they make to each other. Vervet monkeys even have some kind of symbolic noise that they make. They have a particular sound for snake or for eagle, but no other animal, other than humans, has language where we have grammatical rules that are quite complicated about how you organize your sentences. No other animal can use these symbolic bits to generate an infinite number of ideas. So human language is really open ended. Plus, it's universal. Language is the one thing that we do (human-like language, grammatical) that other animals don't. In terms of tool production, yes, we do that and do it very well, but so do chimpanzees. In terms of warfare, which has been suggested as prompting the evolution of intelligence, well, chimps go to war too, and so on. So, it's language.

Evangeline Coker: So, you're working on a book right now that is all about what you're talking about: carrying things as a link to cognition. This book talks about physical changes that are going on, along with cognitive changes. Could you tell us a bit about that?

Dean Falk: Sure. The book I'm working on now goes back to the beginning. I've done extensive work between, let's say, 2.5-4 million years ago, but what I'm doing in this one, which I call *Basket Weaving 101*, is intended to be a trade book or "popular" book. What I'm doing in this is going back to when our ancestors were still in trees. I'm going back to 7 million years and looking at the time from 7 million moving forward. At that point, our ancestors would have been very similar to great apes and all of the great apes sleep in trees and spend a huge amount of time in trees. They do something that's very unique that no monkey does. What that is at the end of the day, wherever they landed that day, they wander around a bit, they climb up into trees, individuals or a mother with her nursing infant attached to her. She'll climb up into a tree late afternoon and then construct a nest to sleep in. They do that by pulling down branches and weaving stems and padding them with leaves. They can be quite elaborate. So, great apes make sleeping nests. They sleep in them. The next morning, they get up, climb back down to the ground, say hi, maybe hang out a little bit, and then they'll begin to move about and start walking and wandering for food and water and maybe other primates. Until again, it's late afternoon and then they climb up into a different tree and make another nest. We actually have the same habit in a sense. Most of us don't have our beds in trees, but we have beds. We make them each day. We make them in the morning instead of the evening, but that is a tree nest. When you got up this morning, you were crawling out of your tree nest.

So that's where I begin the present look at the evolution of cognition. I think those tree nests sparked the entire journey. Our ancestors evolved bodies to walk on two legs – "bipedalism". Mothers could no longer count on their babies hanging on to them all the time because there have been changes in the structure of the foot. Babies' feet couldn't cling anymore, that kind of thing. But a nursing mother needs to keep her infant with her. The way an ape mother does that she doesn't have to do anything. The ape just glues right onto mom. Our infants lost that ability, not that inclination: give a baby your finger and it will hang on to your finger for dear life, but it will not hang on to *you* for dear life. Or if you give it something to hang on to, it can't do it. Those experiments were actually done. You would not do it now, but they were done decades ago. Babies cannot hang on the way that apes do. So, mothers had to figure out how to keep their

babies attached. They already had the ability to make tree nests, to weave botanical material into baskets because a tree nest is like a great big basket in a tree. So that was in the mother's DNA. I think it was just a logical transition to start making little tree nests and hang them on mother's body to keep infants attached to mothers as they wandered. I see tree nests at the bottom of the evolution of baby slings, and baby slings being very important to the evolution of proto-language. The key is the botanical material. We don't have a fossil record. I can't show you a tree nest or a baby sling from 5 million years ago. It's not going to happen. So, a lot of it is speculative. But it's based on comparative information, which is a sound rigorous way to go about asking evolutionary questions.

Botanical material, this is a new idea. We'll see if it flies. I'm not sure it will go over so well with some of my colleagues, because there's this idea entrenched in biological anthropology: the beginnings of higher cognition are reflected in stone tools. You can see that about two and a half million years ago they start to get sophisticated. so cognitive archeologists have said, "Aha, this is the beginning! Two and a half million years ago, this particular kind of hand axe because it's very beautiful and deliberate and took skill and you had to have a pre-conceptualized idea of what it was you were making out of this rock." So that is sort of entrenched in literature. What I'm saying in this book is "wait a minute. Stones are great, but that's recent." What I'm doing is suggesting there was a whole other age equally long that preceded it, which I call the "botanical age" or "botanic age." It's fun. One of the things I'm doing in each of the chapters is I have a little sidebar where I find some worker that's doing research or has done research on some aspect of that chapter. For instance, there's a woman who studied nests, sleeping nests. She's a British person, has done fabulous research so I have a little interview with her. So that's fun to be able to kind of bring into conversation these people who are doing neat, new work. Their interviews are wonderful, the insight they bring, and it's really fun.

Evangeline Coker: What was the process of getting them involved? Did you feel like most of them responded yes right away, or did you feel like it was a challenge?

Dean Falk: Both. Some, yes right away. Some, it was difficult because for instance, one Native American basket weaver or fiber artist, who is fabulous and well-known, super busy. So, it took a while to sort of nudge him. But eventually he did answer the questions and it was very interesting.

Evangeline Coker: Working with other experts in your field, connected with your field, are there any strategies that you would share with other researchers for how to go about that?

Dean Falk: In terms of collaborating, if we're talking about people who are starting out getting their Ph. D.s, going for their first jobs or even if they're still working on their dissertation, what I would suggest is to realize that it's very important that you go to your professional meetings annually. Nobody told me that. I just happened to go anyway because I like meetings. When you go to meetings, you'll meet other people at your same stage. I didn't know 40, 50 years ago that the people I was meeting in physical anthropology would become some of my closest collaborators in research decades down the road, and also very good friends. People would use the term "networking", which I guess is what it is, but it's super important just to go to meetings. It's super important early on to understand the importance of publishing. That's something you

may or may not get from your teachers when you're working on your graduate degree. It's really important to realize that no matter how much you love teaching or doing service work – maybe you want to be a department chair or dean someday or vice president, maybe you aspire to that. It's super important as you're building your career to publish. Do research and publish. Plus, it's fun. "Publish or perish" has been a big part of academic culture in general. Some departments more than others. I've never felt my department saying to me, "Oh, you have to do more." It's not that kind of pressure. I just have a work ethic. What I want to be doing is working because I enjoy it so much. If you love what you're doing, time just flies. I can be working on a paper, *oh my god, where have the last eight hours gone?* Maybe there is less of a tendency nowadays to kind of ease up on some of the pressure on people that are starting out in terms of publishing. I would encourage them to ignore that. *Do* think about publishing.

Evangeline Coker: It makes you more likely to get published in the future too, if you wait for that one book while you don't have a history of articles.

Dean Falk: Right. Research builds on itself. You research one thing, like the thing I just described. Doing the basket weaving project, that came out of something totally different. When you work on something, new questions open up and they're interesting questions.

Evangeline Coker: Do you keep a notepad next to you when the questions you can't answer yet come to mind and you write them down?

Dean Falk: No, but I know what they are.

Evangeline Coker: Do you like to write notes when you're researching, or do you keep that catalogued in your mind?

Dean Falk: I do a lot of research at the computer. I read with a highlighter. I won't take notes. As I'm writing the book, I build collections of notes and articles per chapter. Then when I'm ready to write that chapter, I go back and re-read it all. As I start to write, I will make notes to myself about where I want to go, or I need to get this or that kind of thing.

Evangeline Coker: I know there's a lot of pressure sometimes on researchers for them to find their niche, their little angle, in an area that's going to open up opportunities for them. I don't know how natural it is for everybody. What would you say to somebody who's feeling that pressure, *I need to find my thing*?

Dean Falk: Right. As any graduate student getting ready, say a Ph.D. student, at some point they had better find a thing to do their dissertation on. Often their advisors will help them with that. I know my advisor helped me identify. He didn't just help me, he said, "Here. Somebody needs to look at endocasts of old-world monkeys that's not been done." *Oh, okay.* Being an obedient student. Your mentors can help you identify. Then once you do something, automatically new questions start to open up. You should be thinking, *well, where would I want to go next? What else interests me?* Way down the road, you need to think about getting away from your dissertation topic. If you publish your book and you've done six articles on it, it's time to kind of broaden your horizons and branch out into other areas, too.

Evangeline Coker: Yeah, that's wonderful. Basket weaving is a new area for you. It was one of those that was sparked by something else. I know you also have done a lot of study on Asperger syndrome, a topic that is close to your heart as well. Could you talk a bit about that?

Dean Falk: Sure. I have a beloved granddaughter, Eve Penelope Schofield, who's about to turn 30 (I cannot believe it) next month. When she was a little girl in grade school, she was very odd. We knew that she had something, but we didn't know what. When we took her to specialists, they gave us weird diagnoses. One of Eve's teachers or maybe the librarian when she was nine years old contacted my daughter, Eve's mother, and said, "I've been looking online, and I think I know what Eve has. It's called Asperger's syndrome." That was how I became aware of something called Asperger's syndrome. Once I knew that that was what Eve had, I learned everything I could about it. So that sparked my initial interest which was always there. Because I'm interested in the brain and cognition, I also became interested in it from that point of view, like what's going on neurologically and genetically with Asperger's syndrome. My interest was sparked by my granddaughter, Eve, in conjunction with my interest in the brain and cognition. That led eventually to Eve and me writing a book together on Asperger's syndrome called "Geeks, Genes, and the Evolution of Asperger's Syndrome".

That was a fun journey and productive. I realized in researching that book that there are aspects of higher functioning autism. There are different kinds of higher functioning autism, but there are aspects of it that are very advanced. I started thinking about that in terms of evolution. People with Asperger's syndrome do not have good social skills or social understanding. That's well known. They often have very intense interests, which can be technical. They're often very knowledgeable about and good at what it is they do. They get completely absorbed by it – a state that sometimes is called "flow," or when runners get into the state called "runner's high". This is a positive state in terms of discovering things and inventing things. I think it was important during the evolution of advanced computer technology, for instance, in which you have a lot of people who have autism who have made huge contributions. Anyway, it was that work stemmed out of the work with Evie.

It was fun to work with her on the book. This is an example of what it's like to work with somebody with Asperger's syndrome. They are very rule-oriented, and have to have a routine. For Eve, she came to Tallahassee. We worked on it here. What she wants to do all day is be at her computer. She's out looking at fantasy, literature or manga, these Japanese cartoons. She came to work on the book with me. What she really wanted to do was be out in La-La-Land. So, I said, "Evie, OK, we'll make a deal. You keep track of your computer time during the day, and then you owe our book that much time in the evening." She kept the most meticulous log down to practically the second. This was a rule. She accepted the rule and she totally made good on it. She was born in England and she's a dual citizen; she writes British English. The copy editors at the publishers wanted to put it all in American English. I went, "no, no, no." Her parts, she's writing in UK English, and so her parts are in UK English.

The work on Asperger's syndrome in evolution, because of that, I learned a lot about Hans Asperger, who as a discoverer in 1944 when he's credited as having published a syndrome that later became known as "Asperger's syndrome". He actually discovered it in 1938. I read a lot of

his work, some of it in German, which I had to struggle reading, and had a sense of what the person was like and what a huge contribution he'd made. In 2018, two historians, one American and one Austrian, independently published the claims that Hans Asperger had been a Nazi sympathizer and had not been sympathetic towards his patients and furthermore, facilitated or enabled horrible abuse and even murdering of these children. Well, that struck me as preposterous! I read their works very carefully and decided to respond and write an article which would give the other side, the other viewpoint. I did, and went back and forth with one of these authors where he responded to my response, and I responded to his response. It is a controversy that's out there now, but I really felt somebody had to speak up for Hans Asperger. There are other people that feel the same way, including in Austria. Some people that knew him when he was alive. I'm currently collaborating with them on some archival work where we'll have more to say about it. But this is at an academic level. I think this happened where you had young historians of science, who never knew the person, weren't mature, if anything, they were little kids when this happened, who trashed the reputation of somebody who's not around to defend themselves. This is sort of "academic cancel culture". I don't think it should be allowed to rest unchallenged, so more work on that in the future.

Evangeline Coker: Is that possibly an example of researchers looking for a niche and just not paying attention to who they might smear in the process?

Dean Falk: Good question. I've actually had people say to me, "Dean, you were so lucky you got into a controversy early in your career with a big name." I did, about brain evolution. But I did because I went, I saw the fossils, and I had a view which I could support with evidence. I wasn't thinking, *oh, I'm going to look for controversy*. There are people that look to challenge authorities out there, and this can be a way of getting attention and building a career. In the case of what's happened to Hans Asperger's legacy since 2018 – I think quite possibly, this has been an element in people making the accusations that they've made. Some of which are unsubstantiated and some of which are just plainly not supported by the evidence when you look at the evidence. There's an element of that, I think.

Evangeline Coker: Yeah. You have to do your research and be very careful before you make a value judgment on that person.

Dean Falk: That doesn't mean you shouldn't challenge wrong stuff that's out there. That's how science progresses; how knowledge progresses.

Evangeline Coker: What would you say to those researchers who are coming up against something that feels controversial and maybe they're feeling like it's going to be a sticking point for their career?

Dean Falk: It could be a helpful point for their career if they have evidence. If they have really good reasons for thinking, *oh, that's wrong, I've got a different paradigm*, then go for it. But I think you need to ask your own motives and what evidence do I have, and how selective am I being in the evidence I'm choosing to present? In the case of Hans Asperger, the people – his detractors – were extremely selective, out of context, and ignored other crucial information. In my field, paleoanthropology, it's a vituperative, backstabbing field. People don't always avoid

ad hominem attacks when they're writing. What that does, if you read somebody and they're arguing a strong viewpoint, but they're doing it in terms where they're actually more or less "and that person's an idiot who thinks otherwise." Well, it just loses the argument for them right there. I would say be really careful of your tone. Be cognizant of citing other people. Go *out of your way* to cite other people. You lose nothing by acknowledging that others have made contributions that are relevant to what you're doing. That's another thing I would do.

Evangeline Coker: That's something that impresses me about you is that you're publishing these works that are almost like pedestals. You're bringing other researchers on to talking about the interviews you're having with other researchers, and even your granddaughter. You must feel very secure in your own abilities to give them a spotlight as well.

Dean Falk: It's right. I'm concerned that having other people doing the little sidebars in the book enhances the book. With my book with Eve, my parts are quite technical. It's not really a popular book or trade book. It's more of a crossover. My parts which are on the brain and genetics are *yawn-inspiring*, perhaps to some people. Some of the reviews have said it gets a little technical. Eve's parts are really interesting. She talks in each chapter. She has a segment where she talks about some aspects of that chapter. Like, a chapter might address bullying, and she's talked about her experiences with bullying. It's just hair-raising and really, really engaging. So having things like that improves the book.

Evangeline Coker: Some of your work that comes from the collaborative element actually sprung from happy accidents. One of those was a study you did on Einstein and his brain.

Dean Falk: Right? It was completely serendipitous how I got into that. It began here in Tallahassee, when somebody who was at the Unitarian church had a book group that was going to meet and discuss a book about Einstein. He said, Dean, would you come to this particular discussion and tell us what's known about Einstein's brain? I said, "Oh, okay," because I remembered somewhere I had a little thin, dusty file with like the two things that had ever been published on Einstein's brain. So, I hauled out the file and went to the book discussion, which was fun. When I looked at what had been published, there were a couple of photographs of Einstein's brain which had been removed when he died, and not much had been identified by the author in terms of the cerebral cortex. I realized that there was a really important feature that had not been noted. I also had a hankering to see other views of that brain. This is just a couple of traditional views.

I knew by then that somewhere there were hundreds of photographs of Einstein's entire brain from all different angles and directions. I wanted to get those. I already did a little note on this unusual feature of the cerebral cortex coming out of that experience at the Unitarian church. I did a little description of an area that actually was associated. I truly believe the fact that he was a violinist, a serious violin player. You could see that in a particular bump on the brain, believe it or not. I really wanted to see, in particular, the frontal lobes. I contacted the few experts that had published on Einstein's brain and said, "I know there are somewhere hundreds of photographs. I really would like to get hold of them". Which was unproductive. Doors slammed shut, including the door of somebody who actually had some photos – didn't even answer. Not even the courtesy of an answer. So, there was something strange going on there.

One person I contacted was a man named Fred Lepore, a physician, specialist in eyes. He'd written a wonderful article about the frenzy about Einstein's brain and his death and autopsy. It was a beautifully researched, wonderful article. When I wrote to him, he wrote back and he said, "You know, I've been wondering where those pictures are. Let me see if I can find them." So, he did detective work. He lived in Princeton, New Jersey, which helped. That was where Einstein had lived his last years. He actually located not only hundreds of photographs, but slides of sections of the brain that had been made when he died. Archival material, including his will and other things that no one had ever seen. He found where they were. They were in someone's basement in a box. He persuaded that family, these really belonged to science, and they should donate them to science. Which they did in 2010. They went to the National Museum of Health and Medicine in Silver Springs. A condition the family made on donating the materials was that Fred Lepore, and his colleague —*moi*— would have access. We had first access, and that was the basis for a very fruitful, intense collaboration in which we described the entire cerebral cortex of Albert Einstein. We collated sections of it to the map of the brain. It had been cut up into 240 blocks before some of it was sectioned, and we have a map. We published the map of those blocks. We were able to do a very deep, descriptive study of the brain and make suggestions about what other neuroscientists might want to explore in the future. So, it all came out of a book group with the Unitarian church in Tallahassee. It was a serendipitous, wonderful, happy accident. Fred wrote a book maybe two years ago, "Finding Einstein's brain," where he talks about the whole history of what happened. It was bizarre when Einstein died. What happened was bizarre, and it still is a little bizarre. He described that whole history up to the present, and it's a pretty engaging read.

Evangeline Coker: Is that a crossover book?

Dean Falk: If it's a crossover – maybe. It's *Rutgers Press*. I guess I would describe it as crossover for a curious lay reader. There's a little bit about the brain in it, but the excitement is in the journey.

Evangeline Coker: I find excitement in the journey, too. So, what's on the horizon for you?

Dean Falk: What's on the horizon? Well, I have got to finish this book! I've got a couple of international collaborations on fossils. One's on fossil brain, and the other is on some methods paper. I'm going to Vienna for a month to work with my colleagues there on this "history of science" project on Hans Asperger. Those are the balls that I'm juggling right now.

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